

# PATENT ABSTRACTS OF JAPAN

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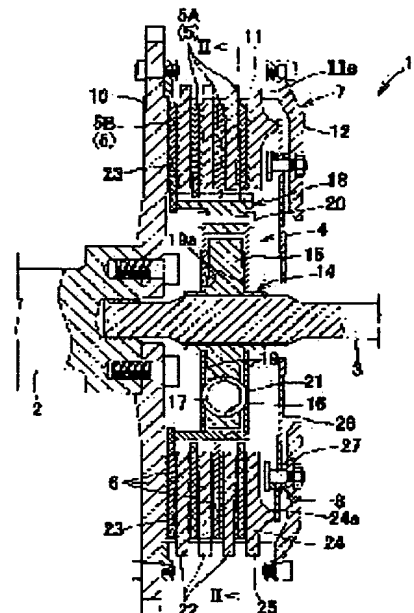
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## (54) MULTIPLE-DISK CLUTCH DEVICE

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a multiple-disk clutch device capable of effectively preventing the transmission loss of turning moment caused by a slip without lowering the operability of a clutch pedal or enlarging the structure of the clutch device in the axial direction.

**SOLUTION:** The multiple-disk clutch device 1 that engages or disengages the crankshaft 2 of an engine with/from the input shaft 3 of the transmission for power transmission, comprises a center boss 14 which is rotated integrally with the input shaft 3, a ring gear 18 fitted onto the center boss 14, a disk support member 4 having a buffering means which transmits the turning moment acting on the ring gear 18 to the center boss 14, shock absorbed through the buffer, and a plurality of inner clutch disks 5 which are mounted on the ring gear 18 freely movably in the axial direction while inhibiting the relative rotation to each other.



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CLAIMS

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[Claim(s)]

[Claim 1] With the pin center,large boss who is multiple-disc-clutch equipment which is intermittent in transfer of the power from an engine crankshaft to the input shaft of transmission, and rotates in one with said input shaft The disk supporter material which has the ring member which carried out sheathing to the pin center,large boss, and a buffer means to buffer the turning effort which acts on a ring member, and to transmit to a pin center,large boss, Two or more inner clutch plates which could move to shaft orientations freely at said ring member, and were formed in relative rotation impossible, The outer clutch plate which was an outer clutch plate arranged between said inner clutch plates, could move to shaft orientations freely at the clutch housing which rotates with a crankshaft, and was formed in relative rotation impossible, Multiple-disc-clutch equipment characterized by having the actuation means which changes the change actuation of said both clutch plates into a connection condition and a fragmentation condition.

[Claim 2] Multiple-disc-clutch equipment according to claim 1 which fixed any one of said two or more inner clutch plates to the ring member.

[Claim 3] Multiple-disc-clutch equipment according to claim 1 or 2 in which the specification part which regulates relative displacement to the shaft orientations of a ring member and an inner clutch plate in contact with an inner clutch plate to a ring member was formed among said 1 set of adjoining outer clutch plates.

[Claim 4] Multiple-disc-clutch equipment according to claim 3 which formed the ring wheel in the periphery section of said ring member, and formed the specification part in the periphery section of a ring wheel in the shape of a protrusion by excising the addendum of a ring wheel in parts other than a specification part.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the multiple-disc-clutch equipment which is intermittent in transfer of the power from an engine to transmission.

[0002]

[Description of the Prior Art] A pressure plate is established in the clutch housing which rotates [ \*\* / \*\*\*\* attachment ] with a crankshaft the clutch plate assembly which has the clutch plate which fixed transfer of the power from an engine to transmission to a buffer means and it as intermittent clutch equipment to the input shaft of transmission, a clutch plate is pinched to the receptacle face-to-face of the clutch housing which meets a pressure plate and it, and what was constituted so that an engine turning effort might be transmitted to transmission is adopted widely.

[0003] However, in such a friction clutch, in spite of having connected the clutch at the time of a heavy load and high power, slipping occurred between the clutch plate and the pressure plate, and there was a problem that the acceleration engine performance and performance-traverse ability fell by the transfer loss of turning effort. Especially, in connection with the high increase in power of the engine in recently, such a phenomenon was becoming remarkable.

[0004] then, like [ in order to prevent such a slipping phenomenon ] the clutch equipment 100 shown in drawing 6 While forming 2 sets of clutch plate assemblies 104 which have the buffer means 102 and a clutch plate 103 in an input shaft 101 and forming the outer clutch plate 105 between the clutch plates 103 of both the clutch plate assembly 104 Can move to shaft orientations freely at the clutch housing 108 which rotates the outer clutch plate 105 and a pressure plate 106 with a crankshaft 107, and it prepares in relative rotation impossible. By pinching a clutch plate 103 and the outer clutch plate 105, and transmitting turning effort through the clutch plate 103 of two sheets between the receptacle sides 109 of the clutch housing 108 which meets a pressure plate 106 and it Friction welding area is increased and what was constituted so that the transfer loss of the turning effort by slipping might be prevented is put in practical use.

[0005] moreover, to JP,10-103370,A While fixing the 1st inner clutch plate to the input plate of a clutch plate assembly By being able to fix to an input plate the tubed engagement section which projects to the side, and being able to move the 2nd inner clutch plate to shaft orientations freely at this tubed engagement section, and attaching to rotation impossible, and transmitting turning effort through the inner clutch plate of two sheets Friction welding area is increased and what was constituted so that the transfer loss of the turning effort by slipping might be prevented is proposed.

[0006]

[Problem(s) to be Solved by the Invention] However, it was difficult for there to be a problem that clutch equipment interferes in a gearbox casing, to attach 3 or more sets of clutch plate assemblies 104, and to prevent the transfer loss of turning effort much more certainly with said clutch equipment 100, if 3 or more sets of clutch plate assemblies 104 are formed, since the clutch plate assembly 104 is comparatively large-sized to shaft orientations. And since the

buffer means was formed in each of a clutch plate assembly, while the manufacture cost of clutch equipment became high, there was also a problem that weight became large.

[0007] On the other hand, although it is possible to aim at reduction of the manufacture cost of clutch equipment and mitigation of weight since the inner clutch plate of two sheets can be attached to said official report to one buffer means with the clutch equipment of a publication It was difficult to constitute from this clutch equipment so that attaching the inner clutch plate of three or more sheets may not be assumed, but the number of sheets of an inner clutch plate may be increased and the transfer loss of turning effort may be prevented much more certainly. And there was a problem that the operability of a clutch fell or endurance fell by the backlash between the tubed engagement section and the 2nd inner clutch plate on the relation which is making the tubed engagement section which carried out press forming of the metal plate, and manufactured it support the 2nd inner clutch plate.

[0008] In addition, setting up greatly the energization force of a diaphragm spring to which the pressure welding of the pressure plate is carried out to a clutch plate as other methods of preventing slipping of the clutch at the time of connection is also considered. However, if the energization force of a diaphragm spring is greatly set up from it being necessary to resist the energization force of a diaphragm spring and to break in clutch pedal as mentioned above when dividing a clutch, another problem that the operability of clutch pedal falls will occur.

[0009] The purpose of this invention is offering effectively the multiple-disc-clutch equipment which can be prevented for the transfer loss of the turning effort by slipping, without reducing the operability of clutch pedal or constituting clutch equipment on a large scale in shaft orientations.

[0010]

[Means for Solving the Problem and its Function] The result examined wholeheartedly that these people should increase the number of sheets of a clutch plate, and should prevent the transfer loss of the turning effort by slipping. It notes that a buffer means resembles shaft orientations markedly as compared with a clutch plate, and is large-sized in the above-mentioned clutch plate assembly. By dividing a clutch plate assembly into a buffer means and a clutch plate, considering it, and attaching two or more clutch plates to one buffer means Based on the way of thinking that the friction welding area of a clutch plate is increased and the transfer loss of the turning effort by slipping can be prevented, it came to complete this invention, without having reduced the operability of clutch pedal or constituting clutch equipment on a large scale in shaft orientations.

[0011] With the pin center, large boss who the clutch equipment concerning this invention is multiple-disc-clutch equipment which is intermittent in transfer of the power from an engine crankshaft to the input shaft of transmission, and rotates in one with said input shaft The disk supporter material which has the ring member which carried out sheathing to the pin center, large boss, and a buffer means to buffer the turning effort which acts on a ring member, and to transmit to a pin center, large boss, Two or more inner clutch plates which could move to shaft orientations freely at said ring member, and were formed in relative rotation impossible, The outer clutch plate which was an outer clutch plate arranged between said inner clutch plates, could move to shaft orientations freely at the clutch housing which rotates with a crankshaft, and was formed in relative rotation impossible, It has the actuation means which changes the change actuation of said both clutch plates into a connection condition and a fragmentation condition.

[0012] With this clutch equipment, since the pressure welding of the clutch plate of two or more sheets which consists of an inner clutch plate and an outer clutch plate is carried out mutually and the turning effort of a crankshaft is transmitted to an input shaft, it becomes possible to fully secure the touch area of a clutch plate, slipping of a heavy load and the clutch plate at the time of high power is prevented, and the fall of the acceleration engine performance by the transfer loss of turning effort or performance-traverse ability can be prevented effectively. Moreover, with a buffer means, since the turning effort to an input shaft is buffered Vibration generated at the time of rapid clutch operation, the impact at the time of sudden start and sudden acceleration, or a half-clutch is absorbed with a buffer means like conventional clutch

equipment. While the burden which acts on drive systems, such as transmission, a differential gear, a drive shaft, and clutch equipment, is sharply mitigable. Since the proper oscillation generated when changing the proper oscillation from an engine, for example, the reciprocating motion of the piston in a reciprocating engine, into rotation is absorbable with a buffer means, transfer of the vibration to the various above drive systems can be lessened, and an unpleasant vibration and generating of the noise can be controlled.

[0013] Furthermore, it becomes possible to increase the number of sheets of an inner clutch plate easily, fully securing the reinforcement with a group of the inner clutch plate to disk supporter material, since disk supporter material could be constituted from a pin center, large boss, a ring member, and a buffer means, and two or more inner clutch plates could be freely moved to shaft orientations at the ring member and it has prepared in relative rotation impossible. And since the close arrangement of an inner clutch plate and the outer clutch plate can be carried out, it becomes possible to increase the number of sheets of a clutch plate, clutch equipment preventing becoming large-sized as much as possible to the shaft orientations of an input shaft. So, it becomes possible to incorporate the inner clutch plate of a maximum of 4-5 sheets reasonable also to existing clutch equipment. Moreover, since it is not necessary to establish two or more buffer means, it becomes possible to control the rise of the manufacture cost of clutch equipment, and increase of weight as much as possible.

[0014] Here, any one of said two or more inner clutch plates may be fixed to a ring member. In this case, although backlash occurs between input shafts with a pin center, large boss, since backlash does not occur between the inner clutch plate fixed to the ring member, and a ring member, the fall of the operability of the clutch by backlash can be reduced as much as possible. Moreover, the fault that a ring member moves to shaft orientations and falls out from an inner clutch plate where a clutch is cut can be prevented certainly.

[0015] The specification part which regulates relative displacement to the shaft orientations of a ring member and an inner clutch plate in contact with an inner clutch plate to a ring member may be formed among said 1 set of adjoining outer clutch plates. In this case, since backlash occurs, respectively between a pin center, large boss, between input shafts and a ring member, and an inner clutch plate, although some operability of a clutch falls, the fault that a ring member moves to shaft orientations and falls out from an inner clutch plate can be certainly prevented with an easy configuration.

[0016] A ring wheel may be formed in the periphery section of said ring member, and a specification part may be formed in the periphery section of a ring wheel in the shape of a protrusion by excising the addendum of a ring wheel in parts other than a specification part. In this case, it becomes possible to form a specification part, without preparing another member or performing special processing.

[0017]

[Embodiment of the Invention] Hereafter, it explains, referring to a drawing about the gestalt of operation of this invention. As shown in drawing 1 and drawing 2, multiple-disc-clutch equipment 1. It is what is intermittent between the engine crankshaft 2 and the input shaft 3 of transmission in transfer of the turning effort from a crankshaft 2 to an input shaft 3. Two or more inner clutch plates 5 which could move to shaft orientations freely through the disk supporter material 4 at the input shaft 3, and were formed in relative rotation impossible. The outer clutch plate 6 which was the outer clutch plate 6 arranged between the adjoining inner clutch plates 5, could move to shaft orientations freely at the clutch housing 7 which rotates with a crankshaft 2, and was formed in relative rotation impossible. The connection condition which carried out the pressure welding mutually, and the fragmentation condition estranged mutually are equipped with the actuation means 8 which carries out change actuation of both the clutch plates 5 and 6 at shaft orientations, and it is constituted as follows.

[0018] As shown in drawing 1, the approximate circle tabular flywheel 10 is fixed to the right end section of a crankshaft 2 with a bolt, the approximately cylindrical housing 11 which projects to right-hand side is formed in the section near the periphery of a flywheel 10, and the annular covering member 12 prolonged to the inner circumference side of housing 11 is being fixed to the right end section of housing 11. A clutch housing 7 consists of a flywheel 10, housing 11, and

a covering member 12, and it is constituted so that it may be fixed to the right end section of a crankshaft 2 and may rotate in one with a crankshaft 2.

[0019] The left end section of an input shaft 3 is inserted into a clutch housing 7, the right end center section of the crankshaft 2 is equipped free [ rotation ], and the castellated-shaft section 13 is formed in the clutch housing 7 at the section near the left end of an input shaft 3.

[0020] the pin center, large boss 14 who the disk supporter material 4 is freely movable to shaft orientations at the castellated-shaft section 13 of an input shaft 3, and fits into relative rotation impossible, and the pin center, large boss 14 -- shaft orientations -- migration -- impossible -- and within the limits of a fixed include angle -- setting -- relativity -- it has the ring wheel 18 as a ring member which carried out sheathing pivotable, and a buffer means to buffer the turning effort from the ring wheel 18 to the pin center, large boss 14. In addition, if the fitting structure of the pin center, large boss 14 and an input shaft 3 is the fitting structure [ displace / and / relatively / to shaft orientations / it / freely ] which cannot be relative rotated, fitting structures of arbitration, such as fitting structure using spline fitting, a key, and a key seat, can be used for it.

[0021] when a buffer means is explained, it is shown in drawing 1 and drawing 2 -- as -- the pin center, large boss 14 -- on the way -- the approximate circle tabular flange 15 prolonged to the method of outside is formed in the section, and it is radial [ of a flange 15 ] -- on the way -- the angle hole-like hold hole 16 opens spacing in the section, and is prepared six at a circumferential direction at it, and each hold hole 16 is equipped with the damper spring 17 which consists of a compression spring. a flange 15 -- a ring wheel 18 -- a fixed include angle -- relativity -- outer fitting is carried out pivotable, the approximate circle tabular connecting plate 19 is formed in the right-and-left both sides of a flange 15, the connecting plate 19 on either side is connected with a ring wheel 18 by the rivet 20 in the section near the periphery, and relative displacement to the shaft orientations of the ring wheel 18 to the pin center, large boss 14 is regulated by the connecting plate 19 on either side. the location corresponding to the hold hole 16 -- setting -- the connecting plate 19 on either side -- the diameter of the damper spring 17 -- narrow -- the hold hole 16 and abbreviation -- the regulation hole 21 of the shape of an angle hole of the same die length is formed, and omission of the damper spring 17 from the hold hole 16 are prevented because the periphery section of the damper spring 17 contacts the peristome of the regulation hole 21. Moreover, the periphery section of the damper spring 17 is projected from the regulation hole 21 to the method of the outside of always, and it is constituted so that the both ends of the damper spring 17 may always meet the peristome of the regulation hole 21. And the turning effort which acts on a ring wheel 18 is transmitted to the pin center, large boss 14 through a connecting plate 19 and the damper spring 17, and fluctuation of the turning effort from the ring wheel 18 to the pin center, large boss 14, i.e., fluctuation of the turning effort from the inner clutch plate 5 to an input shaft 3, is buffered by a connecting plate 19 and a flange 15 carrying out relative rotation, and compressing the damper spring 17 between the peristome of the hold hole 16, and the peristome of the regulation hole 21.

[0022] However, if fluctuation of the turning effort of the inner clutch plate 5 is buffered and it can transmit to an input shaft 3 as a buffer means, it is possible to adopt the thing of the configuration of arbitration. For example, it is also possible to adopt what changed the number of the damper spring 17, or replaced with the damper spring 17, and prepared elastic members, such as synthetic resin, synthetic rubber and a pan spring, and a \*\*\*\* spring. Moreover, coating layer 19a which consists of molybdenum which was excellent in abrasion resistance at both the connecting plates 19 in the contact part of both the connecting plates 19 and the pin center, large boss 14 may be formed, and printing and galling between a connecting plate 19 and the pin center, large boss 14 may be prevented. Furthermore, the division configuration of the boss section by which outer fitting is carried out to the pin center, large boss's 14 flange 15 and input shaft 3 may be carried out, and you may unify with a rivet etc.

[0023] 1st inner clutch plate of three sheets 5A can move to shaft orientations freely at a ring wheel 18, and fitting is carried out to relative rotation impossible, and 2nd inner clutch plate of one sheet 5B is being fixed to the edge by the side of the flywheel 10 of a ring wheel 18 by a bolt, a screw, welding, etc. Thus, as shown in drawing 1, it is regulated that a ring wheel 18

moves to shaft orientations relatively to the inner clutch plate 5 where multiple-disc-clutch equipment 1 is attached, and it consists of fixing 2nd inner clutch plate of one sheet 5B to a ring wheel 18 so that omission from the inner clutch plate 5 of a ring wheel 18 may be prevented. Moreover, by 2nd inner clutch plate 5B being fixed to a ring wheel 18, the backlash between a ring wheel 18 and the inner clutch plate 5 is prevented, and the operability of a clutch improves. However, in this example, although the left end inner clutch plate 5 was fixed to the ring wheel 18, even if it fixes the inner clutch plate 5 of which location to a ring wheel 18, it is possible to acquire the same effectiveness. Moreover, although the ring member which consists of a ring wheel 18 was adopted, if it is the member of the shape of a ring which can be freely displaced relatively to shaft orientations at 1st inner clutch plate 5A, and fits into relative rotation impossible, spline fitting, a key, and the ring member that fits into 1st inner clutch plate 5A inside through fitting structures of arbitration, such as fitting structure using a key seat, are employable.

[0024] The annular outer clutch plate 6 is formed between the adjoining inner clutch plates 5, slit 11a prolonged to shaft orientations every fixed spacing in a hoop direction is formed in housing 11, the fitting projected part 22 which fits into slit 11a is formed in the periphery section of the outer clutch plate 6 of three sheets, and the outer clutch plate 6 is freely movable to housing 11 with fitting of slit 11a and the fitting projected part 22 at shaft orientations, and it is attached to relative rotation impossible. If the fitting structure of the outer clutch plate 6 and housing 11 is the fitting structure [ displace / and / relatively / to shaft orientations / it / freely ] which cannot be relative rotated, fitting structures of arbitration, such as fitting structure using spline fitting, a key, and a key seat, can be used for it.

[0025] Although the number of sheets of the inner clutch plate 5 can be set as arbitration and the number of sheets of the outer clutch plate 6 will be set up few one sheet rather than the inner clutch plate 5, when the inner clutch plate 5 is set as five or more sheets, since these clutch plates 5 and 6 cannot be attached in the existing housing 11, it is desirable to set it as 2-4 sheets. Without completely changing the configuration of the existing clutch housing 7, when the inner clutch plate 5 is set as three sheets and the outer clutch plate 6 is set as two sheets like multiple-disc-clutch equipment 1A especially shown in drawing 3, since it becomes possible to attach both the clutch plates 5 and 6, it is desirable. That is, although the flywheel 10 needed to be constituted from multiple-disc-clutch equipment 1 shown in drawing 1 using the inner clutch plate 5 four sheets in the flat configuration as compared with the flywheel of conventional clutch equipment so that it might understand as compared with the conventional multiple-disc-clutch equipment shown in drawing 6 In this multiple-disc-clutch equipment 1A, it becomes possible to say nothing of housing 11, the covering member 12, or the actuation means 8 to adopt conventional clutch equipment and an isomorphism-like thing also about flywheel 10A.

[0026] Next, when clutch plates 5 and 6 are explained to a connection condition and a fragmentation condition about the actuation means 8 which carries out change actuation, as they are shown in drawing 1 Make 2nd inner clutch plate 5B meet a flywheel 10, and the annular receptacle side 23 is formed. Between the covering member 12 and the inner clutch plate 5, the annular pressure ring 24 which operates the inner clutch plate 5 to a flywheel 10 side is formed. The fitting projected part 25 which fits into slit 11a of housing 11 is formed in the periphery section of the pressure ring 24, and the pressure ring 24 is freely movable to housing 11 at shaft orientations, and it is attached to relative rotation impossible. When a diaphragm spring 26 is fixed to the left-hand side of the covering member 12 through two or more support pins 27, the pressure welding of the periphery section of a diaphragm spring 26 is carried out to control unit 24a of the pressure ring 24 and the pressure ring 24 is always energized by the energization force of a diaphragm spring 26 to clutch plate 5 and 6 side, clutch plates 5 and 6 win popularity with the pressure ring 24, and it is pinched between fields 23, and is held at the condition that the clutch was connected.

[0027] In the right-hand side of a diaphragm spring 26, sheathing of the migration to shaft orientations of the operating member besides illustration is made free to an input shaft 3, and if clutch pedal is broken in and operated, an operating member moves to left-hand side, the inner circumference section of a diaphragm spring 26 is operated to a flywheel 10 side, a diaphragm



spring 26 bends backward centering on the support pin 27, the periphery section of a diaphragm spring 26 estranges from control unit 24a of the pressure ring 24, and it will be in the condition that the clutch was cut.

[0028] Next, actuation of said multiple-disc-clutch equipment 1 is explained. The turning effort of a crankshaft 2 is transmitted to the outer clutch plate 6 of three sheets, and the pressure ring 24 through it and the clutch housing 7 which rotates in one. and in the condition which broke in and operated clutch pedal, i.e., the condition of having cut the clutch Although the outer clutch plate 6 and the inner clutch plate 5 estrange and the turning effort of the outer clutch plate 6 is not transmitted to the inner clutch plate 5 In the condition, i.e., the condition of having connected the \*\* clutch, of having broken in clutch pedal and not operating it The outer clutch plate 6 and the inner clutch plate 5 are pinched between the receptacle side 23 and the pressure ring 24 by the energization force of a diaphragm spring 26. By carrying out the pressure welding of the receptacle side 23, the pressure ring 24, and the outer clutch plate 6 to the inner clutch plate 5 The turning effort of a crankshaft 2 will be transmitted to the inner clutch plate 5, and where fluctuation of turning effort is further absorbed through a buffer means from the inner clutch plate 5, it will be transmitted to an input shaft 3. With this multiple-disc-clutch equipment 1, since the friction welding area of a clutch is fully securable by using two or more inner clutch plates 5 and outer clutch plates 6, slipping of a heavy load and the clutch plate at the time of high power will be prevented, and the fall of the acceleration engine performance by the transfer loss of turning effort or performance-traverse ability can be prevented.

[0029] Moreover, it becomes possible to attach the inner clutch plate 5 and the outer clutch plate 6 in a clutch housing 7, without constituting multiple-disc-clutch equipment 1 on a large scale in shaft orientations by arranging two or more inner clutch plates 5 in the periphery section of one ring wheel 18. Without completely changing the configuration of the existing clutch housing 7, when the inner clutch plate 5 is set as three sheets and the outer clutch plate 6 is set as two sheets like multiple-disc-clutch equipment 1A especially shown in drawing 3, since it becomes possible to attach both clutch plates, it is desirable.

[0030] Furthermore, since 1st inner clutch plate 5A could be freely displaced relatively to shaft orientations to the ring wheel 18 of the disk supporter material 4 and has fitted into relative rotation impossible, backlash occurs between 1st inner clutch plate 5A and a ring wheel 18, but since it is fixing to a ring wheel 18, between 2nd inner clutch plate 5B and a ring wheel 18, backlash does not generate 2nd inner clutch plate 5B. For this reason, generating of the backlash between the inner clutch plate 5 and a ring wheel 18 will be prevented, and the operability of a clutch will improve.

[0031] In addition, although 2nd inner clutch plate 5B was fixed to the ring wheel 18 with said multiple-disc-clutch equipments 1 and 1A As two or more inner clutch plates 5 can be freely moved to shaft orientations to ring wheel 18B like 1st inner clutch plate 5A, and it prepares in relative rotation impossible like multiple-disc-clutch equipment 1B shown in drawing 4 and it is shown in drawing 4 and drawing 5 In between 1 set of adjoining outer clutch plates 6 to each addendum of ring wheel 18B The specification part 30 which regulates relative displacement to the shaft orientations of ring wheel 18B and the inner clutch plate 5 in contact with the inner clutch plate 5 is formed in the shape of a protrusion. Ring wheel 18B for example, by moving to right-hand side in drawing 4 The fault that ring wheel 18B drops out of the left end inner clutch plate 5 will be prevented. Although attaching another member to a ring wheel can also form such a specification part 30, it manufactures the ring wheel which formed the gear tooth of the same cross-section configuration as a specification part 30 covering full, for example, and can form it easily by excising addendum parts other than the location corresponding to the specification part 30 of this ring wheel by cutting etc. In addition, if the formation location of a specification part 30 is between 1 set of adjoining outer clutch plates 6, it can be prepared in the location of the arbitration of ring wheel 18B. Moreover, the configuration which prevents omission of the ring wheel from an inner clutch by the specification part 30 can be similarly applied to the disk supporter material which omitted the buffer means.

[0032]

[Effect of the Invention] According to the clutch equipment concerning this invention, slipping of

a heavy load and the clutch plate at the time of high power is prevented. The fall of the acceleration engine performance by the transfer loss of turning effort or performance-traverse ability can be prevented. While the burden which acts on drive systems, such as transmission, a differential gear, a drive shaft, and clutch equipment, is sharply mitigable like conventional clutch equipment Fully securing the reinforcement with a group of the inner clutch plate to that an unpleasant vibration and generating of the noise can be controlled, and disk supporter material The number of sheets of a clutch plate can be increased preventing that the number of sheets of an inner clutch plate can be increased easily, and that clutch equipment becomes large-sized to the shaft orientations of an input shaft as much as possible. Since it is not necessary to establish two or more that it becomes possible to incorporate the multiple-disc-clutch equipment which has the inner clutch plate of a maximum of 4-5 sheets reasonable, and buffer means in the arrangement tooth space of existing clutch equipment Effectiveness, like the rise of the manufacture cost of clutch equipment and increase of weight can be controlled as much as possible is acquired.

[0033] Here, since backlash will not occur between an inner clutch plate and a ring member although backlash occurs between input shafts with a pin center, large boss if any one of two or more inner clutch plates is fixed to a ring member, the fall of the operability of the clutch by backlash can be reduced as much as possible. Moreover, the fault that a ring member moves to shaft orientations and falls out from an inner clutch plate where a clutch is cut can be prevented certainly.

[0034] Although some operability of a clutch will fall by backlash if the specification part which regulates relative displacement to the shaft orientations of a ring member and an inner clutch plate in contact with an inner clutch plate to a ring member is formed among 1 set of adjoining outer clutch plates, the fault that a ring member moves to shaft orientations and falls out from an inner clutch plate can be certainly prevented by the easy configuration.

[0035] Furthermore, a ring wheel is formed in the periphery section of a ring member, and by excising the addendum of a ring wheel in parts other than a specification part, if a specification part is formed in the periphery section of a ring wheel in the shape of a protrusion, it will become possible to form a specification part, without preparing another member or performing special processing.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] Drawing of longitudinal section of multiple-disc-clutch equipment

[Drawing 2] The II-II line sectional view of drawing 1

[Drawing 3] Drawing of longitudinal section of the multiple-disc-clutch equipment of other configurations

[Drawing 4] Drawing of longitudinal section of the multiple-disc-clutch equipment of other configurations

[Drawing 5] The front view of a ring wheel used with this multiple-disc-clutch equipment

[Drawing 6] Drawing of longitudinal section of conventional multiple-disc-clutch equipment

[Description of Notations]

1 Multiple-Disc-Clutch Equipment

2 Crankshaft

3 Input Shaft

4 Disk Supporter Material

5 Inner Clutch Plate

5A Inner clutch plate

5B Inner clutch plate

6 Outer Clutch Plate

7 Clutch Housing

8 Actuation Means

10 Flywheel 11 Housing

11a Slit 12 Covering member

13 Castellated-Shaft Section 14 Pin Center,large Boss

15 Flange 16 Hold Hole

17 Damper Spring 18 Ring Wheel

19 Connecting Plate 19a Coating Layer

20 Rivet 21 Regulation Hole

22 Fitting Projected Part 23 Receptacle Side

24 Pressure Ring

24a Control unit 25 Fitting projected part

26 Diaphragm Spring

27 Support Pin

1A Multiple-disc-clutch equipment 10A Flywheel

1B Multiple-disc-clutch equipment 18B Ring wheel

30 Specification Part

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[Translation done.]